CLAIMS:

1. A video encoder (110) for compressing an input stream (214) of video frames, comprising:

base layer circuitry comprising a motion compensated discrete cosine transform (MC-DCT) coder (203) operable to compress base layer video data associated with the input stream (214) to generate compressed base layer video data suitable for transmission over a network (106); and

enhancement layer circuitry operable to compress enhancement layer video data associated with the input stream (214) to generate compressed enhancement layer video data suitable for transmission over the network (106), the enhancement layer circuitry comprising a plurality of motion compensated temporal filters (204) operable to process the enhancement layer video data in an overcomplete wavelet domain.

2. The video encoder (110) of Claim 1, further comprising:

a wavelet transformer (202) operable to transform each of the video frames into a plurality of video bands;

a low band shifter (206) operable to generate one or more overcomplete wavelet expansions, the motion compensated temporal filters (204) operable to use the one or more overcomplete wavelet expansions when filtering the video frames, the MC-DCT coder (203) and at least one of the motion compensated temporal filters (204) generating one or more motion vectors;

a first encoder (208) operable to encode the video bands after filtering by the motion compensated temporal filters (204);

a plurality of second encoders (210) operable to encode the motion vectors; and

a multiplexer (212) operable to multiplex the encoded video bands and the encoded motion vectors onto an output bitstream (220).

3. The video encoder (110) of Claim 2, wherein:

the MC-DCT coder (203) comprises one of an MPEG-2 encoder, an MPEG-4 encoder, and an H.26L encoder;

the motion compensated temporal filters (204) comprise unconstrained motion compensated temporal filters; and

the second encoders (210) comprise entropy encoders.

4. A video decoder (118) for decompressing a video bitstream (220), comprising:

base layer circuitry comprising a motion compensated discrete cosine transform (MC-DCT) decoder (407) operable to decompress base layer video data contained in the bitstream (220) to generate decompressed base layer video data; and

enhancement layer circuitry operable to decompress enhancement layer video data contained in the bitstream (220) to generate decompressed enhancement layer video data, the enhancement layer circuitry comprising a plurality of inverse motion compensated temporal filters (408) operable to process the enhancement layer video data in an overcomplete wavelet domain.

5. The video decoder (118) of Claim 4, further comprising:

a demultiplexer (402) operable to demultiplex encoded video bands and encoded motion vectors from the bitstream (220);

a first decoder (406a) operable to decode a first set of the motion vectors, the MC-DCT decoder (407) operable to process the video band forming the base layer using the first set of the decoded motion vectors;

a second decoder (406b) operable to decode a second set of the motion vectors, the inverse motion compensated temporal filters (408) operable to process the video bands forming the enhancement layer using the second set of decoded motion vectors;

an inverse wavelet transformer (410) operable to transform the processed video bands into a plurality video frames; and

a low band shifter (412) operable to generate one or more overcomplete wavelet expansions, the inverse motion compensated temporal filters (408) operable to use the one or more overcomplete wavelet expansions when processing the video frames.

6. The video decoder (118) of Claim 5, wherein:

the MC-DCT decoder (407) comprises one of an MPEG-2 decoder, an MPEG-4 decoder, and an H.26L decoder;

the inverse motion compensated temporal filters (408) comprise inverse unconstrained motion compensated temporal filters; and

the first and second decoders (406) comprise entropy decoders.

7. A method (600) for compressing an input stream (214) of video frames, comprising:

compressing base layer video data associated with the input stream (214) using motion compensated discrete cosine transform (MC-DCT) coding to generate compressed base layer video data suitable for transmission over a network (106); and

compressing enhancement layer video data associated with the input stream (214) using motion compensated temporal filtering in an overcomplete wavelet domain to generate compressed enhancement layer video data suitable for over the network (106).

8. The method (600) of Claim 7, wherein compressing the base layer video data and the enhancement layer video data comprises generating one or more motion vectors, and further comprising:

transforming each of the video frames into a plurality of video bands;

generating one or more overcomplete wavelet expansions, wherein compressing the enhancement layer video data comprises compressing the enhancement layer video data using the one or more overcomplete wavelet expansions;

encoding the video bands after the motion compensated temporal filtering;

encoding the motion vectors; and

multiplexing the encoded video bands and the encoded motion vectors onto an output bitstream.

9. A method (700) for decompressing a video bitstream (220), comprising:

decompressing base layer video data contained in the bitstream (220) using motion compensated discrete cosine transform (MC-DCT) decoding to generate decompressed base layer video data; and

decompressing enhancement layer video data contained in the bitstream (220) using inverse motion compensated temporal filtering in an overcomplete wavelet domain to generate decompressed enhancement layer video data.

10. The method (700) of Claim 9, further comprising:

demultiplexing encoded video bands and encoded motion vectors from the bitstream (220);

decoding a first set of the motion vectors and a second set of the motion vectors, wherein decompressing the base layer video data comprises decompressing the base layer video data using the first set of the decoded motion vectors and decompressing the enhancement layer video data comprises decompressing the enhancement layer video data using the second set of decoded motion vectors;

transforming restored video bands into a plurality video frames; and

generating one or more overcomplete wavelet expansions, wherein decompressing the enhancement layer video data comprises decompressing the enhancement layer video data using the one or more overcomplete wavelet expansions.

11. A video transmitter (102), comprising:

a video frame source (108) operable to provide a stream of video frames;

a video encoder (110) operable to compress the video frames, the video encoder (110) comprising:

base layer circuitry comprising a motion compensated discrete cosine transform (MC-DCT) coder (203) operable to compress base layer video data associated with the stream to generate compressed base layer video data suitable for transmission over a network (106); and

enhancement layer circuitry operable to compress enhancement layer video data associated with the stream to generate compressed enhancement layer

video data suitable for transmission over the network (106), the enhancement layer circuitry comprising a plurality of motion compensated temporal filters (204) operable to process the enhancement layer video data in an overcomplete wavelet domain; and

a buffer (112) operable to receive and store the compressed video frames for transmission over the network (106).

12. The video transmitter (102) of Claim 11, further comprising:

a wavelet transformer (202) operable to transform each of the video frames into a plurality of video bands;

a low band shifter (206) operable to generate one or more overcomplete wavelet expansions, the motion compensated temporal filters (204) operable to use the one or more overcomplete wavelet expansions when filtering the video frames, the MC-DCT coder (203) and at least one of the motion compensated temporal filters (204) generating one or more motion vectors;

a first encoder (208) operable to encode the video bands after filtering by the motion compensated temporal filters (204);

a plurality of second encoders (210) operable to encode the motion vectors; and

a multiplexer (212) operable to multiplex the encoded video bands and the encoded motion vectors onto an output bitstream (220).

13. A video receiver (104), comprising:

a buffer (116) operable to receive and store a video bitstream;

a video decoder (118) operable to decompress the video bitstream and generate video frames, the video decoder (118) comprising:

base layer circuitry comprising a motion compensated discrete cosine transform (MC-DCT) decoder (407) operable to decompress base layer video data contained in the bitstream to generate decompressed base layer video data; and

enhancement layer circuitry operable to decompress enhancement layer video data contained in the bitstream to generate decompressed enhancement layer video data, the enhancement layer circuitry comprising a plurality of inverse

motion compensated temporal filters (408) operable to process the enhancement layer video data in an overcomplete wavelet domain; and

a video display (120) operable to present the video frames.

14. The video receiver of Claim 13, further comprising:

a demultiplexer (402) operable to demultiplex encoded video bands and encoded motion vectors from the bitstream;

a first decoder (406a) operable to decode a first set of the motion vectors, the MC-DCT decoder (407) operable to process the video band forming the base layer using the first set of the decoded motion vectors;

a second decoder (406b) operable to decode a second set of the motion vectors, the inverse motion compensated temporal filters (408) operable to process the video bands forming the enhancement layer using the second set of decoded motion vectors;

an inverse wavelet transformer (410) operable to transform the processed video bands into a plurality video frames; and

a low band shifter (412) operable to generate one or more overcomplete wavelet expansions, the inverse motion compensated temporal filters (408) operable to use the one or more overcomplete wavelet expansions when processing the video frames.

15. A computer program embodied on a computer readable medium and operable to be executed by a processor, the computer program comprising computer readable program code for:

compressing base layer video data associated with an input stream (214) of video frames using motion compensated discrete cosine transform (MC-DCT) coding to generate compressed base layer video data suitable for transmission over a network (106); and

compressing enhancement layer video data associated with the input stream (214) using motion compensated temporal filtering in an overcomplete wavelet domain to generate compressed enhancement layer video data suitable for transmission over the network (106).

16. The computer program of Claim 15, wherein the computer program further comprises computer readable program code for:

transforming each of the video frames into a plurality of video bands;

generating one or more overcomplete wavelet expansions, wherein compressing the enhancement layer video data comprises compressing the enhancement layer video data using the one or more overcomplete wavelet expansions;

encoding the motion vectors; and

multiplexing the encoded video bands and the encoded motion vectors onto an output bitstream.

17. A computer program embodied on a computer readable medium and operable to be executed by a processor, the computer program comprising computer readable program code for:

decompressing base layer video data contained in a video bitstream (220) using motion compensated discrete cosine transform (MC-DCT) decoding to generate decompressed base layer video data; and

decompressing enhancement layer video data contained in the bitstream (220) using inverse motion compensated temporal filtering in an overcomplete wavelet

domain to generate decompressed enhancement layer video data.

18. The computer program of Claim 17, wherein the computer program further comprises computer readable program code for:

demultiplexing encoded video bands and encoded motion vectors from the bitstream (220);

decoding a first set of the motion vectors and a second set of the motion vectors, wherein decompressing the base layer video data comprises decompressing the base layer video data using the first set of the decoded motion vectors and decompressing the enhancement layer video data comprises decompressing the enhancement layer video data using the second set of decoded motion vectors;

transforming restored video bands into a plurality video frames; and

generating one or more overcomplete wavelet expansions, wherein decompressing the enhancement layer video data comprises decompressing the enhancement layer video data using the one or more overcomplete wavelet expansions.

19. A transmittable video signal produced by the steps of:

compressing base layer video data associated with an input stream (214) of video frames using motion compensated discrete cosine transform (MC-DCT) coding to generate compressed base layer video data suitable for transmission over a network (106); and

compressing enhancement layer video data associated with the input stream (214) using motion compensated temporal filtering in an overcomplete wavelet domain to generate compressed enhancement layer video data suitable for transmission over the network (106).